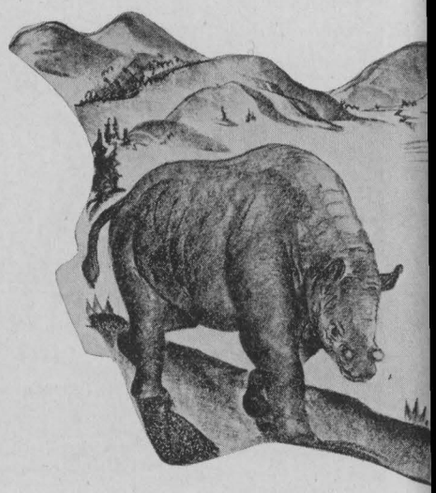
When TITANS ROAMED PREHISTORIC DEATH VALLEY



By CHESTER STOCK

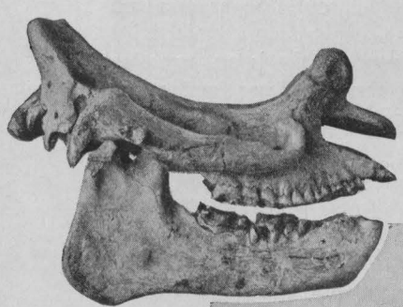
A breakdown on a rutty road; a chance look up a canyon; and scientists dig out a colossal story of life in Death Valley thirty million years ago!

CHANCE discovery frequently reveals in unusual places the remains of creatures long extinct. Once a find of this type is made, subsequent exploration may lead to wholly unexpected and, on occasion, to surprising evidence of the past life of the earth. A striking example of this is the discovery of titanotheres, the titan or thunder beasts, in ancient rocks exposed in the Grapevine Mountains immediately northeast of Death Valley.

These giants among the mammals of their day are known to have lived for a comparatively short period of time, geologically speaking, and died out on the North American Continent some thirty million years ago. During that racial history they grew from animals smaller than sheep to creatures of elephantine size, ten to thirteen feet long with a height at the shoulders of approximately eight feet. Many fossil skulls and skeletal parts of these mammals have been found in the Big Badlands of Colorado, Nebraska, and South Dakota and elsewhere in the western Great Plains as well as in deposits of earlier age exposed in some of the intermontane basins of the Rocky Mountains. However, until the discovery of titanothere remains in the Death Valley region, these ancient beasts were entirely unknown from that great arid region which comprises the Great Basin and extends from the Rocky Mountains on the east to the Sierra Nevada and Cascade Range on the west.

Their former existence in this vast area is now brought to light for the first time by the keen observation and field experience of H. Donald Curry, acting range-naturalist in Death Valley National Monument. Curry, in traveling by automobile over the little-used road from the ghost-town of Rhyolite, Nevada, to the deserted mining camp of Leadfield in Titus Canyon, found it necessary to make repairs in the road where it traverses the northeastern slopes of the mountain mass of the Grapevine Mountains. Examining the maroon-colored rocks exposed in the road cut, his eye caught the glint of an object partly uncovered in the face of the solid rock. Closer inspection showed that the small object which glistened in the sunlight was a tooth of some fossil mammal. With further digging Curry soon had a portion of a lower jaw with several teeth sufficiently free from the surrounding rock, to be removed from the face of the cut.

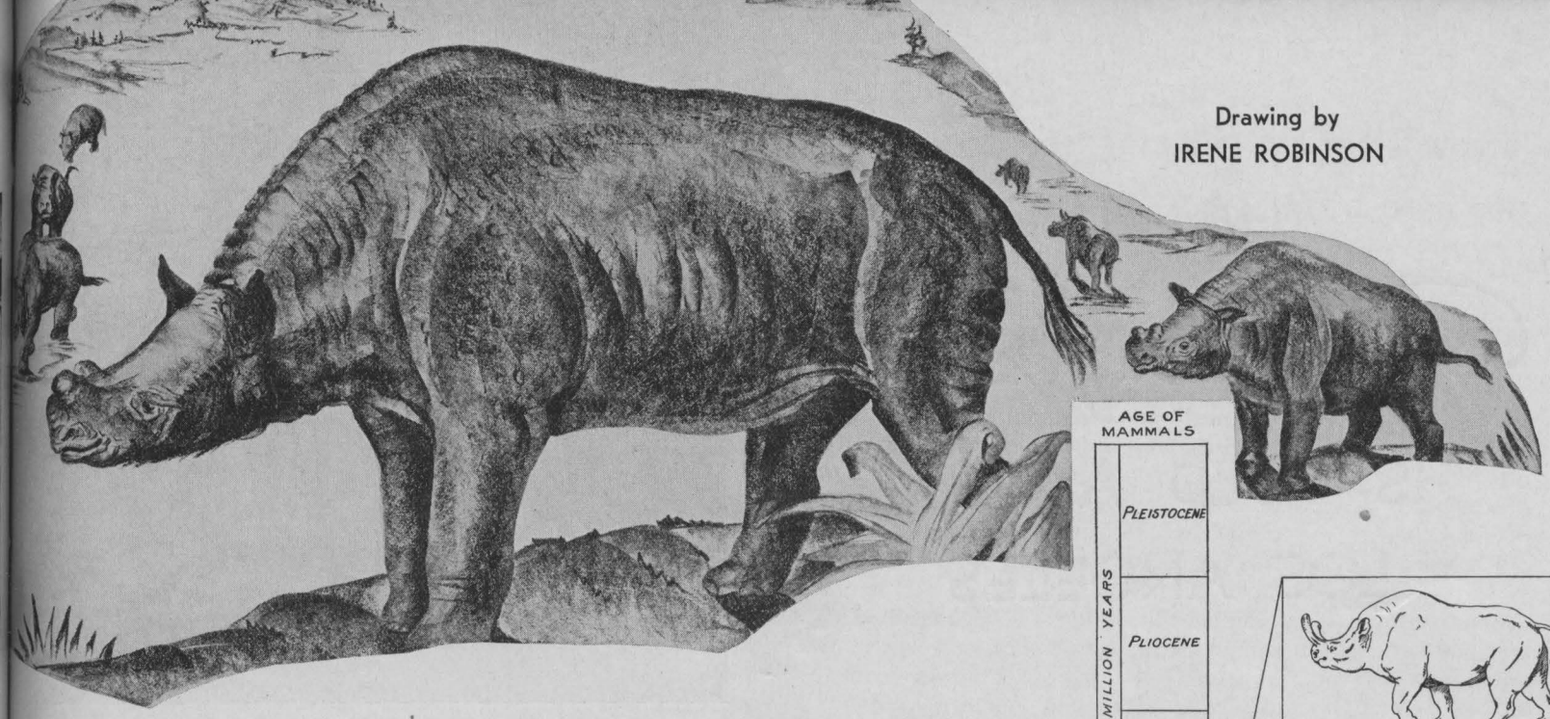
Only those who have experienced the back-breaking toil and endless search in barren places for fossils, the everyday lot of the professional "bone-digger", can fully appreciate the joy that comes with unexpected reward in the discovery of a truly choice specimen. Such was our delight at this locality for later excavation by the California Institute of Technology revealed a skull and the remainder of the lower jaw belonging to the animal found by Curry. The skull is only slightly distorted and is remarkably well preserved, a fact all the more unusual when one realizes that thousands of feet of sediments were laid down on top of it and that after the accumulation of this material there followed great kneading forces of mountain building which folded and crumpled the strata. The skull, still largely encased in sandstone, was removed in the field in eight or ten sections and more than three weeks of laboratory preparation were required to free it from the rock. So thoroughly replaced is the organic material by the mineral salts which have infiltrated the specimen that it is difficult on occasion to determine where the bone stops and the rock begins.



At the left is Donald Curry's accidental find, the skull of a titanothere, which led to a whole series of amazing discoveries. Below is a party of doughty scientists—decidedly not the armchair-and-spectacles sort—digging for fossil mammals in the Grapevine Mountains

The titanotheres are distant cousins of the rhinoceroses, and the skull found in the Grapevine Mountains is not unlike that of a living rhinoceros with, however, some noteworthy differences. Perhaps the most striking difference at first glance is seen in the horns. In the modern rhinoceroses one or two horns are present, one situated on the nose, the other on the frontal region of the skull. The horns are made of chitenous or horny material and develop from the skin. Where they rest on the skull, the bone surface becomes roughened and bulges upward somewhat to give added strength in the support of these structures.

In the titanotheres, on the other hand, two



Drawing by
IRENE ROBINSON

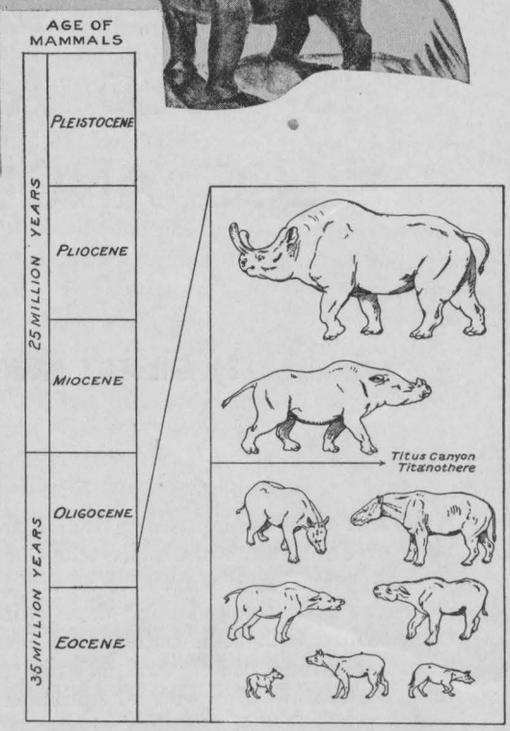
club-like processes or outgrowths from the nasal bones are situated in transverse line above and in front of the eye-sockets and were doubtless used as battering-rams in combat. The heavy skull was well trussed to withstand the strain it was subjected to in the use of these weapons. The processes became of extraordinary size in some of the last representatives of the group before the latter died out on the North American Continent.

These animals, judged in the light of their small brain-size, were doubtless stupid creatures depending largely on their size, mass, and weight and on the defensive structures which they possessed in their struggle for existence. The animal found in the Death Valley region bulked larger than the living rhinoceros. The horns or nasal protuberances, while larger than comparable structures in titanotheres of the Eocene epoch, or the period when the modern types of mammals first appeared on the earth, had not reached the size which they acquired in many of these forms just prior to their extinction.

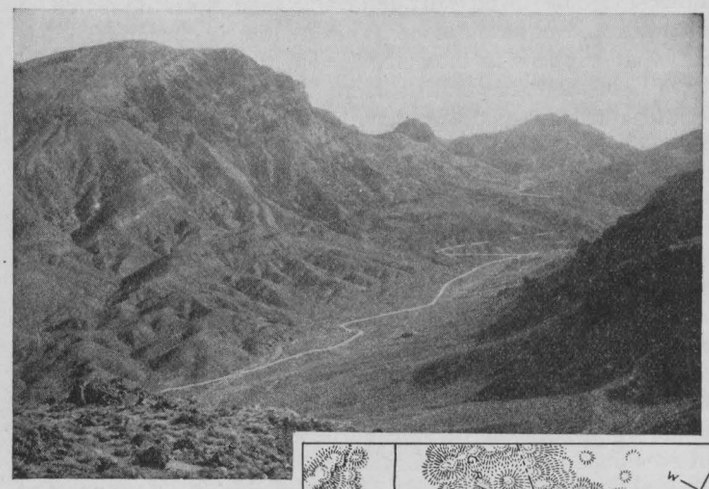
Examination of the maroon-colored deposits, similar to those in which the skull was found, for a distance of thirty miles along the front of the Funeral and Grapevine mountains led to the uncovering of other individuals of these great beasts.

The position of the fossil material in the sandstones and shales exposed in the Death Valley region clearly shows that these animals lived, died, and were buried in these sediments prior to the great outpourings of molten rock or lava, the rhyolites and basalts, which now constitute large portions of the mountain masses adjacent to Death Valley and the Amargosa Desert. Moreover, on the basis of stage of evolution of the titanotheres and on the structural characters by which the associated mammals are identified, we can establish with a considerable degree of certainty the position of this particular assemblage in the sequence of the past mammalian life for the North American Continent. A conservative estimate would place its age as not younger than thirty-five millions of years.

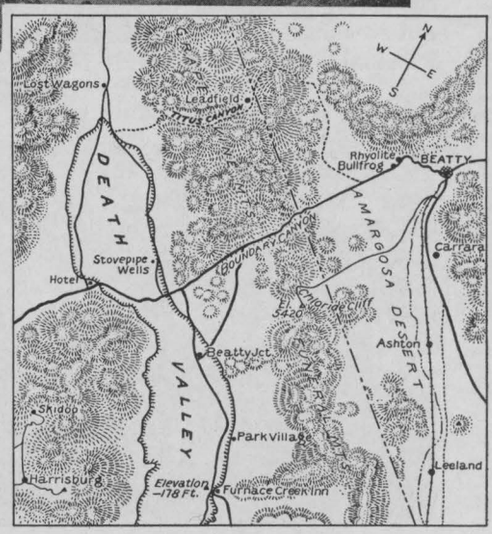
The occurrence of titanotheres and of other browsing mammals in the Death Valley region at that remote time clearly points to the presence of a climate and of an available food supply quite at variance with conditions as they prevail today at this locality and emphasizes the striking changes which specific areas undergo with the passing of geologic time. The geologic study gives evidence of the existence of a mountain range which antedated the present Grapevine Mountains. In front of this range occurred a valley or basin, of unknown extent, amply supplied with water. Here, in lake and stream, were laid down the sediments in which were buried and entombed the remains of creatures whose presence in the region would have remained unknown but for a strange concatenation of circumstances.



The table at the right illustrates the growth and development of the titanothere from a hornless creature the size of a sheep in Eocene times to a beast larger than our elephant in Lower Oligocene days. (Restorations after H. F. Osborn)



Above is Titus Canyon. The rock formation in which the fossil remains were found is seen exposed along the low rounded ridges on the left



Right, a sketch-map showing Titus Canyon. Discoveries in this region included a primitive horse no bigger than a setter, a light, fast rhinoceros, two rodents, a tapir-like animal and other mammals